



EERC

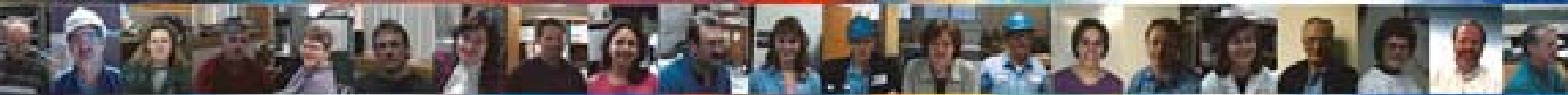
Energy & Environmental Research Center

EERC Technology – Putting Research into Practice

EERC – Building Private-Public Partnerships – *It's All About Culture*

**Jointly Sponsored University Coal Research (UCR) and Historically Black Colleges and Universities and Other Minority Institutions (HBCU/OMI)
Peer Review Meeting**

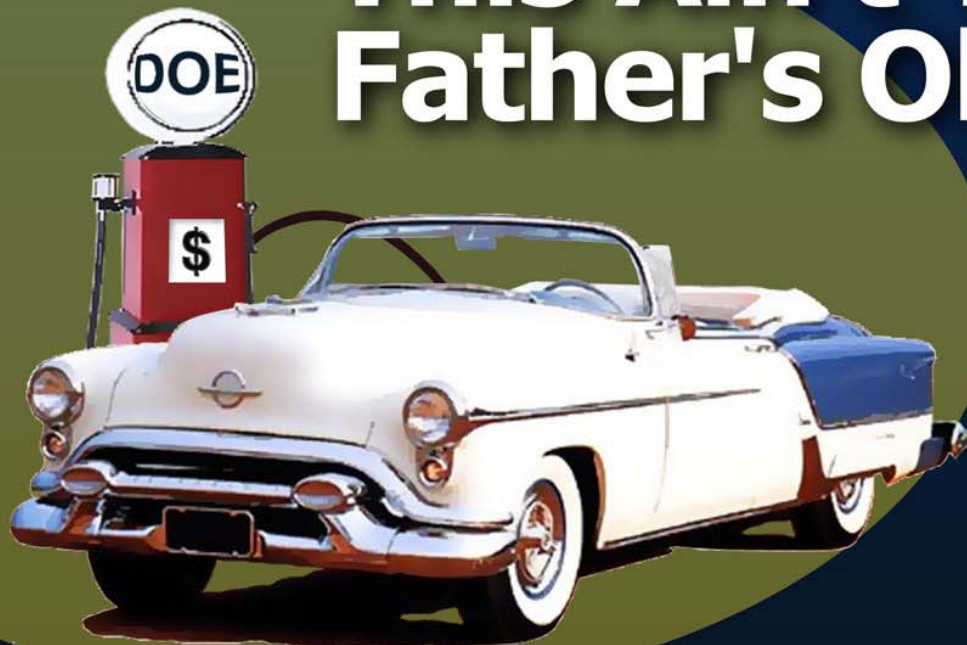
June 3, 2003



Thomas Erickson, Associate Director for Research

Energy & Environmental Research Center
University of North Dakota

This Ain't Your Father's Oldsmobile!



FY1983

1 Active Contract

0% Nonfederal



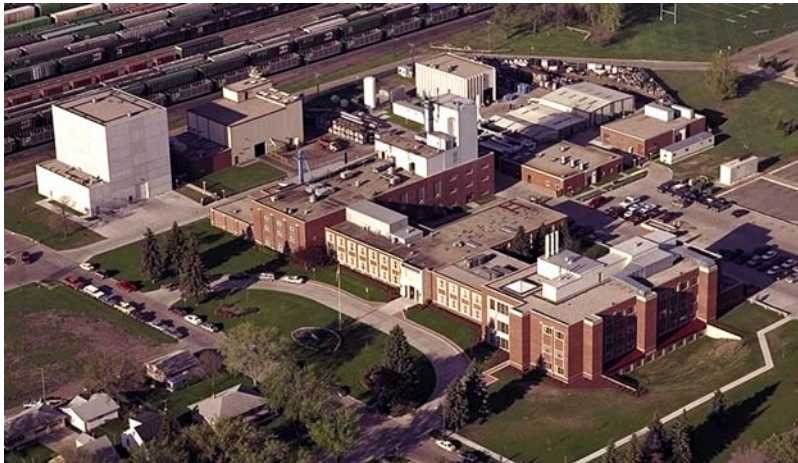
FY2002

241 Active Contracts

84% Nonfederal

About the EERC

The EERC is a research, development, demonstration, and commercialization facility recognized internationally for its expertise in:



“The EERC is a first-class organization, with highly motivated and experienced professionals and technicians...One of the best—or the best—R&D facilities in the United States and world...”
—U.S. Department of Energy evaluation report

- Cleaner, more efficient energy technologies (coal, wind, biomass).
- Air and water pollution prevention and cleanup.
- Water management.
- Soil contamination cleanup and site remediation.
- Waste management.
- Advanced analytical methods.
- Education and training.

EERC 1983



EERC 2003



**The EERC receives
no state-appropriated
funding for RDD&C.**

EERC Facts

- More than 720 clients in 47 countries and 50 states.
- 62% of clients are repeat customers, and more than 84% of contracts are with non-Federal clients.
- Multidisciplinary team of more than 250 highly skilled scientists, engineers, and support personnel.
- Ground was broken July 30, 2002, for an \$8 million project which will update existing facilities and add 47,000 square feet. The new facilities include two 3-story buildings that will accommodate 90 additional staff, new laboratories, and meeting rooms.
- Current facilities include more than 169,000 square feet of laboratory, demonstration, and office space.
- More than 241 active contracts.
- Sends out an average of one funding proposal per day.
- Annual contract awards: \$11.5 million in 1999, \$15.4 million in 2000, \$19 million in 2001, \$20 million in 2002, and **\$50 million in 2006.**
- An estimated regional economic impact of more than \$70 million.
- Fourteen spin-off companies.

- **Business**

INTERNATIONAL MARKET

- Government

•Academia•

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China,
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and Spain, and

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EERC – Providing Opportunities

Clean Coal



The Great Plains Synfuels Plant in the foreground and the Antelope Valley Station in the background are located in central North Dakota.

Recognized internationally, the EERC is one of the world's leading coal research, development, demonstration, and commercialization facility.

EERC – Providing Opportunities

Value-Added Agricultural Products

Biomass/Ethanol/Biofuels

Through the National Alternative Fuels Laboratory (NAFL), a cornerstone EERC program which serves as the “Underwriter’s Laboratory” for ethanol and other oxygenated fuels for the U.S. Department of Agriculture, the EERC finds scientifically based answers to critical technical questions related to those fuels in order to assist in bringing new products to market.



The EERC worked in partnership with the University of North Dakota's John D. Odegard School of Aerospace Sciences to demonstrate an unleaded, ethanol-based fuel for piston-engine aircraft.

EERC – Providing Opportunities

Wind – The Next Value-Added Crop

Objectivity, Not Emotion

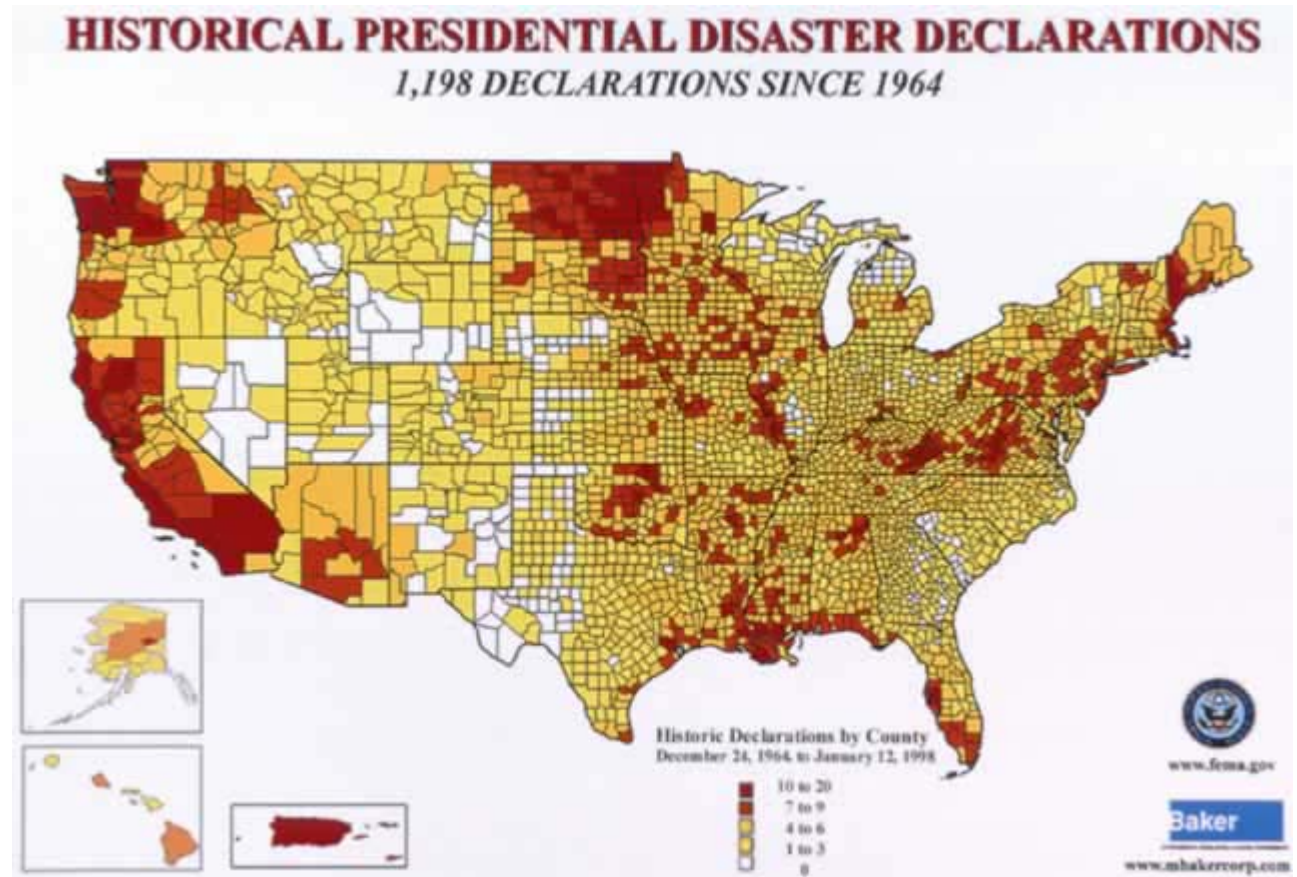
The EERC's Plains Organization for Wind Energy Resources (POWER) conducts field demonstrations of wind energy technologies, assesses wind energy resources, and provides technical and logistical support for wind development in the upper Midwest.



EERC – Providing Opportunities

Water

Water is the petroleum of the 21st century, the key to economic development.



*“Whiskey is for drinking,
water is for fighting.”*
- Mark Twain

Center for Air Toxic Metals



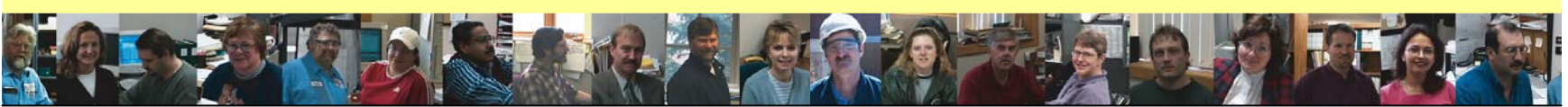
Through its EPA-designated Center for Air Toxic Metals (CATM) and other programs related to air quality, the EERC addresses environmental issues regarding the emission of mercury, hazardous pollutants, and fine particulate from power plants and other industrial sources.

*"Overall, the Center appears to be among the best of those funded by EPA."
EPA Peer Review Committee evaluating the EERC CATM Program*

By conducting field tests on operating power plants, the EERC helped refine more accurate techniques to measure mercury emissions.

EERC Keys to Success

A unique culture



- A willingness to assume risk (freedom, not security)
- Practical research approach
- A commitment to commercialize innovative technologies
- A dedication to building partnerships with the private sector, government, and the research community

“The currency of life is relationships.”

EERC Philosophy

All federal funds are considered as potential joint venture opportunities with the private sector.

Result: Numerous strategic business partnerships

EXAMPLE

A National Model Program

EERC Joint Venture Program with DOE 1989–2002

DOE	Nonfederal
\$28.6 Million	\$38.8 Million

CASH ONLY

The EERC does not count in kind.

Communication

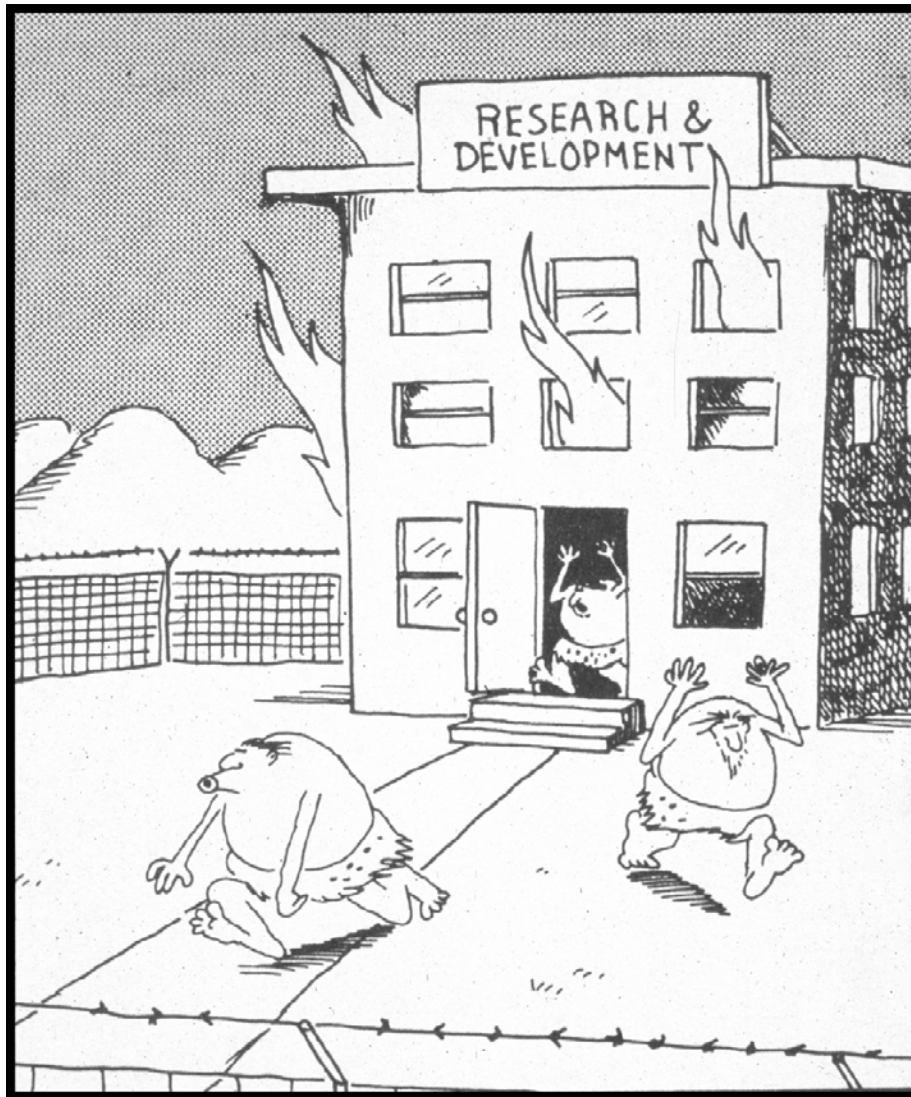
- At the EERC, someone answers the phone.
- E-mail is notification, not communication.

Peer Review

**...when someone votes with
their dollars, euros, yen, or
other currency for what you
are doing.**

Technology Commercialization

Partnerships with industry from the beginning—from the most basic initial work to technology commercialization.



Fire is invented.

**Don't invent anything
that nobody wants!**

– Thomas Edison



RESEARCH
DEVELOPMENT
DEMONSTRATION
COMMERCIALIZATION

Partnerships with industry from the beginning—from the most basic initial work to technology commercialization.

You Must Bring the Commercial Partner in Early

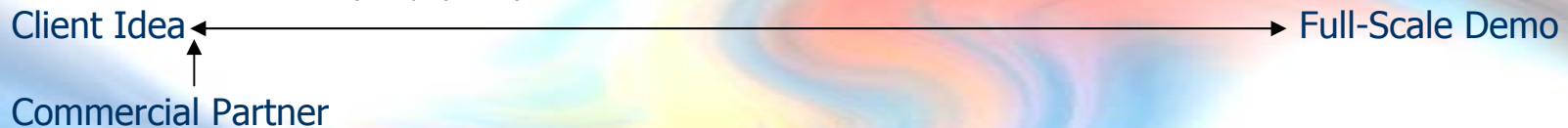
Advanced Hybrid™

8 Years, >\$5,000,000 to EERC



Ash By-Products (Confidential)

3 Years, >\$1,000,000 to EERC



Subcritical Extractions

7 Years, >\$2,000,000 to EERC



Ash Behavior Modeling

10 Years, >\$3,000,000 to EERC



EERC Commercialization

One example: ADVANCED HYBRID™ Filter

- **What is the ADVANCED HYBRID™ Filter?**
 - A pollution control technology that removes microscopic particles from exhaust gases of coal-fired power plants, incinerators, and cement production facilities
- **Partners**
 - W.L. Gore & Associates, Inc.
 - ELEX AG, Switzerland
 - Otter Tail Power Company
 - NorthWestern Energy
 - Montana–Dakota Utilities
 - U.S. DOE's National Energy Technology Laboratory
 - EERC Foundation
- **Global market**
 - Coal-fired power plants and mineral industry facilities
 - Gore hopes to capture 15%–20% of an estimated **\$5 billion** annual worldwide market
- **Opportunities for the region**
 - Global high-tech reputation
 - Jobs in research, development, demonstration, commercialization, and manufacturing
 - Capital flowing into the region



The Big Stone Power Plant now operates at 100% capacity (450 MW) with the new full-scale ADVANCED HYBRID™ Filter.

Key to University Spin-Off Commercialization

A Culture of Partnerships

- Private sector
- Economic development organizations
(regional, state, and federal)
- City
- Congressional delegation
- University



Working with strategic partners such as the Grand Forks Region Economic Development Corporation (EDC), the EERC creates new economic development opportunities. Pictured are EERC Director Gerald Groenewold and the EDC Executive Committee Board of Directors.

Underpinning: A Willingness to Assume Risk

Economic development is not a creationist activity. It is an evolutionary activity requiring a wise, long-term (typically 10 years) strategy and financial commitment.

**JOBS ARE NOT CREATED;
JOBS EVOLVE.**





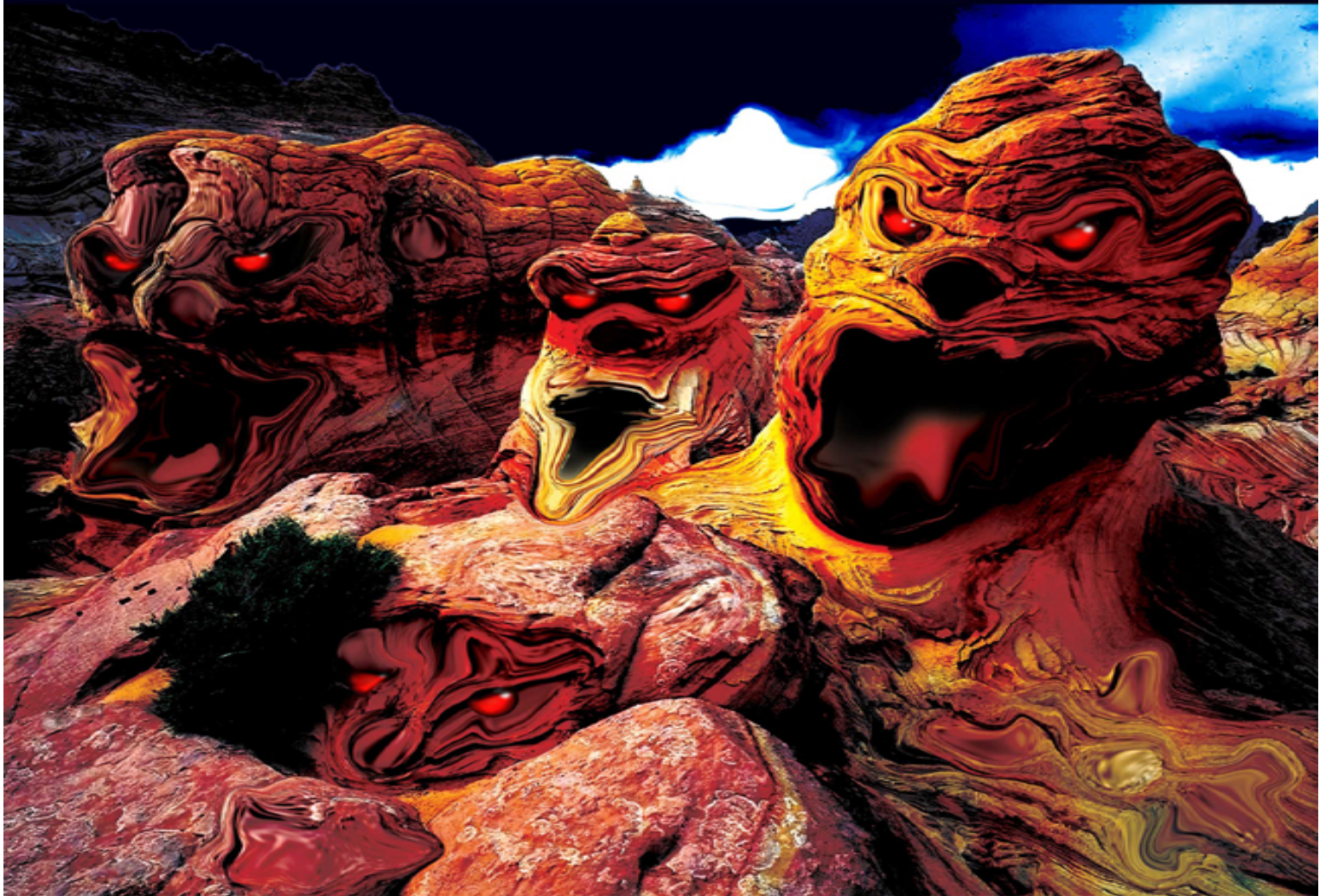
The Energy & Environmental Research Center Foundation (EERCF) is a key piece of infrastructure to facilitate commercialization of EERC-developed technology.



EERCF

- Totally separate from the EERC and UND
- Incorporated under the laws of the state of North Dakota
- Nonprofit corporation organized under section 501(c)(3) of the Internal Revenue Code

Demonstration – The Valley of Death



The Bridge over the Valley of Death





"See that sign on my wall? It's the international symbol for 'Don't Rock the Boat'."

Contact Information



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